

What is claimed is:

Sub a1
1. An isolated antibody which specifically binds to a polypeptide comprising an amino acid sequence selected from the group consisting of:

5 a) an amino acid sequence of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7,

b) a naturally-occurring amino acid sequence having at least 90% sequence identity to the sequence of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7,

10 c) a biologically-active fragment of the amino acid sequence of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7, and

d) an immunogenic fragment of the amino acid sequence of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7.

Sub B3
15 2. A pharmaceutical composition comprising the antibody of claim 1 in conjunction with a suitable pharmaceutical carrier.

20 3. A method of preparing a polyclonal antibody with the specificity of the antibody of claim 1 comprising:

a) immunizing an animal with the polypeptide of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7, or an antigenically-effective fragment thereof under conditions to elicit an antibody response;

Sub B3
b) isolating animal antibodies; and

c) screening the isolated antibodies with the polypeptide thereby identifying a polyclonal antibody binds specifically to the polypeptide of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7.

25 4. An antibody produced by a method of claim 3.

Sub B4
30 5. A pharmaceutical composition comprising the antibody of claim 4 in conjunction with a suitable pharmaceutical carrier.

Sub B4 > 6. A method of making a monoclonal antibody with the specificity of the antibody of claim 1 comprising:

- 5 conditions to elicit an antibody response;
- a) immunizing an animal with the polypeptide of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7, or an antigenically-effective fragment thereof under
 - b) isolating antibody producing cells from the animal;
 - c) fusing the antibody producing cells with immortalized cells in culture to form monoclonal antibody-producing hybridoma cells;
 - d) culturing the hybridoma cells; and
 - e) isolating from the culture monoclonal antibodies which binds specifically to the polypeptide of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7.

7. A monoclonal antibody produced by a method of claim 6.

Sub B5 > 8. A pharmaceutical composition comprising the antibody of claim 7 in conjunction with a suitable pharmaceutical carrier.

9. The antibody of claim 1, wherein the antibody is:

- 20
- (a) a chimeric antibody;
 - (b) a single chain antibody;
 - (c) a Fab fragment; or
 - (d) a F(ab')₂ fragment.

25 10. The antibody of claim 1, wherein the antibody is produced by screening a Fab expression library.

11. The antibody of claim 1, wherein the antibody is produced by screening a recombinant immunoglobulin library.

30 12. A method for detecting polypeptide of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7 in a sample comprising the steps of:

- a) combining the antibody of claim 1 with a sample under conditions to allow specific binding; and
- b) detecting specific binding, wherein specific binding indicates the presence of polypeptide of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7 in the sample.

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13. A method of using an antibody to purify polypeptide of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7 from a sample, the method comprising:

- a) combining the antibody of claim 1 with a sample under conditions to allow specific binding; and
- b) separating the antibody from the protein, thereby obtaining purified polypeptide of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7.

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